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ABSTRACT

The Preparing Tomorrow's Teachers to Use Technology (PT3) Project was created by the U.S. Department of Education to address the need for newly certified teachers to be able to integrate technology in their first years of teaching. The U.S. Education Department's PT3 Program has provided funding for projects nationwide. At the School of Education at the University of Pittsburgh, a funded project is underway and is designed to address the issues of technology use and instruction for pre-service teachers. The PT3 Project at the University of Pittsburgh was designed to help teachers become users of each of four types of technology applications that are regularly implemented by teachers who are considered successful technology integrators: personal use, classroom management, teaching technology skills to students, and integration to curriculum. This PT3 Project was constructed of a number of features, each expected to promote increased technology use by building skills and community. These features include: On-Site Support Staff support, individually chosen projects, and whole group community activities with community building activities embedded into each. Each of these features includes many activities to provide technology learning support. During the course of the pilot year of the PT3 Project at University of Pittsburgh, several strategies for increasing technology learning and community building were tested, and results were noted. Promising strategies and components identified by teachers as most effective in helping them to reach their technology goals are noted. A summary of lessons learned is given. (Contains 15 references.) (AEF)

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First Year of Technology Mentoring for Teachers and Faculty: Lessons Learned

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Introduction:

Rapid changes in the available computer hardware and software applications along with continuous new releases of software applications have created a constant challenge for teachers who are trying to keep up with new technological improvements. In other words, in order to teach and facilitate their students' learning with the support of the available computer software applications as well as tools, teachers have to update their technology skills constantly.

Many schools acquired technology tools and software application to catch up the current technology applications in educational field, however, without proper in-service training of teachers, the use of these technology cannot be optimized. The current related to teachers' effective technology integration may be divided into following sections:

a) On-going training with rehearsal time: The teachers' technology training should include learning experiences that give them opportunities to practice the currently learned skills. Without practice, it should not be expected that teachers will go to their classrooms and will apply those skills.

b) Curricular approaches to increased technology use: The technology training offered to the teachers should include the situations that they will be using in their professional lives. Especially for novice technology learners, it is hard to make connections between the skills they are learning and how to integrate those skills into their teaching practice. Therefore, showing examples in some teaching related situations will inspire teachers and will lead them to think of more innovative ways to use those skills in their teaching practices.

c) Increasing comfort with the technology: Having an opportunity to practice the skills they have learned will increase teachers comfort level significantly. Once they have gained experience with new skills, they will be more comfortable sharing those skills with their colleagues and students while integrating them into their teaching.

d) Continuous technical support related to learning and using hardware and software: It is always frustrating for users to be stuck on a computer related problem and not be able to resolve it promptly. In such circumstances, if it is possible to get technical support in reasonably enough time, frustration will be diminished and the teacher dealing with the problem can productively continue his/her work. Prompt technical support is especially very important if the technical troubles arise in a classroom during the learning process. Unfortunately, this kind of prompt technical support is not usually available in many schools and settings. Anticipation of problems that won't be resolved in time to complete instruction reduces the likelihood that teachers will attempt to use it in their teaching. It creates frustration from the both the students' and teachers' perspective. Sometimes teachers even have to prepare the instructional materials in another format just incase any technical problem arises, so it doubles the work of teacher preparation. Available technical support offered to the teachers is a crucial factor in their decisions to use technology in the classroom.

The PT3 Project: Preparing Tomorrow's Teachers to Use Technology

The Preparing Tomorrow's Teachers to Use Technology Project was created by the U.S. Department of Education to address the need for newly certified teachers to be able to integrate technology in their first years of teaching. The U.S. Education Department's PT3 Program has provided funding for projects nationwide. At the School of Education at the University of Pittsburgh, a funded project is underway and is designed to address the issues of technology use and instruction for pre-service teachers.

The PT3 Project at the University of Pittsburgh focuses in part on the faculty and teachers who work closely with students who are working toward teaching certification. It involves increasing the integration of technology into the training offered to these teachers and faculty. The University of Pittsburgh received two separate grants: a Capacity Building Grant in 1999 to serve as a pilot, and an Implementation Grant to fund 3 years of implementation of the successful pilot beginning in 2000.

The PT3 Project at the University of Pittsburgh was designed to help teachers become users of each of four types of technology applications that are regularly implemented by teachers who are considered successful technology integrators. These four types are:

- Personal Use refers to using technology to increase personal productivity. The first application of the technology that teachers are likely to use usually related to technology training for their "personal use" of the technology. This refers to the idea that teachers' experience with technology tools and applications that produce results useful outside of the professional arena will help teachers significantly transfer those knowledge and skills into their professional needs.

- Classroom Management refers to the use of computer tools and applications to organize classroom information, record keeping, and to create professional looking products.

- Teaching Technology Skills to Students implies that before students can become involved in the activities that technology provides that promote higher order thinking skills, they have to be able to use the tools, and teachers have to know how to

teach the necessary skills. Students' computer experiences vary from novice to expert in the same classroom because of their different backgrounds and exposure to technology. Teachers sometimes report difficulties providing satisfying answers to the technology related questions their students' ask.

- Integration to Curriculum refers to the application of the use of technology to teaching in ways that increase learning and frequently require students to use higher order thinking skills. "Integration to curriculum" is significantly important in terms of teachers' teaching experiences in the classrooms. Being comfortable using the available educational and commercial software programs and integrating them effectively into their teaching, teachers will be able to create more innovative and up to date as well as interesting learning experiences for their students that will facilitate student learning in more unique and resourceful ways.

The professional development package created for technology training for teachers attempted to expose teachers to all of these areas of technology use, but was also devised to prevent the difficulties that teachers often have when making attempts to use technology in the classroom. More traditional professional development strategies often are not as effective as expected in improving the implementation of classroom technology. Some components of the support developed within this PT3 Project include: collaboration and community that includes all school personnel, technology learning support in addition to technical support; cognitive strategies for technology learning; and the building of comfort and confidence. Within each of these components, several additional issues are addressed.

Features of the PT3 Project at University of Pittsburgh

This PT3 Project was constructed of a number of features, each expected to promote increased technology use by building skills and community. These features include On-Site Support Staff support, individually chosen projects, and whole group community activities with community building activities imbedded into each. Each of these features includes many activities to provide technology learning support.

On-Site Support Staff

Each teacher and faculty member participating in the PT3 Project at University of Pittsburgh was supported as they learned to use technology by On-Site Support Staff members. Teachers and faculty were provided very individualized support as they learned new skills and worked toward their own technology use goals. On-site Support Staff identified the types of skills participants needed to learn in order to complete the projects they chose, and adapted training very specifically to the needs of the learners. Also, keeping constant contact by e-mail and phone to remind the scheduled weekly appointments as well as the monthly meetings, had promoted teachers participation in these appointments and meetings.

The Support Staff also held mini-workshops that participants were invited to attend. These workshops were non-traditional, in that they were expected to serve fewer than ten attended at a time, and the covered only specific skills during the one to one and a half hour meetings. Support Staff often focused the workshops specifically to the needs of the individuals attending, and invited those individuals who would benefit from a specific skill areas. The Support Staff were skillful in finding different ways of presenting the same instruction including supporting handouts, examples and hands-on practice until the teachers became comfortable doing the tasks alone. They used these techniques when working with individuals as well as in workshops. Many of the workshops were scheduled at times when the Support Staff felt that a number of individuals would benefit from learning the same skills.

In the on site training sessions, teachers from two schools were initially provided support individually with plans to work as small groups later on. In the third school, teachers' on-site support was provided in a small group format from the start. The teachers who were being helped individually were resistant to joining together with other teachers when meeting with Support Staff, and tended to want to continue to work individually. Based on this difficulty in community building, On-Site small group support is recommended instead of solely individual assistance.

Individually Chosen Project

Each participating teacher and faculty member in the PT3 Project was required to choose a realistic project, called the individually chosen project, that could be applied in their own classroom. The projects were required to meet two guidelines: they had to be related to classroom work, and they had to be projects that required the teacher to add to their own technology skills in order to complete them. Depending on the skill level of the teachers at the onset of PT3 Participation (which ranged from none to quite proficient), the individually chosen projects could be well integrated curriculum enhancement projects to be implemented by students, or they could require that only the teacher use the computer, while becoming more comfortable with their own technology skills. Allowing each individual to choose a project rather than assigning projects gave each individual ownership of their own learning, and allowed them to choose a project that they felt would be useful.

One of the most difficult aspects of the individually chosen projects for the participants was committing to a project that they did not have the skills to complete. Much reassurance was required on the part of the On-Site Support Staff that projects were expected to be revised over time, as participants became more familiar with the technology and its implementation. As a result, many projects changed between the time that they were chosen at the beginning of the school year, and at time that they were implemented.

Another result was the reaction of pilot year participants to the discomfort of new participants in the first full year of the grant. Experienced participants reassured the newcomers that they should chose a project that they found exciting, and not concern themselves with how they would eventually produce it: there was enough support and flexibility to make it happen. Also, their technical support person would be helping them to achieve their goals and providing them with the required technical skills so that they would be able to complete their project.

The teachers were encouraged, but not required, to work collaboratively with other teachers on these projects. The On-Site Support Staff who assisted the teachers at times suggested matches between teachers with similar interests or complimentary skills, with the expectation that these teachers would eventually begin to see one another as resources. Although no teachers chose to work collaboratively on a project during the first year, a number of collaborative projects emerged during planning for the second year. The On-Site Support Staff encouraged collaborative projects with expectations that these efforts would help to increase problem solving and promote an increase in confidence for participants. Long term effectiveness of the PT3 Project is also based on the building of strong and supportive learning communities among peers, allowing growth to continue long after funding is finished.

Whole Group Community Activities

All participants of the project were required to take part in activities that were intended to bring the group together, with the expectation that sharing would support the likelihood of the formation of a community of technology users. Several different types of meetings were held. Monthly meetings were held on Saturday mornings, and activities promoted interaction between participants related to technology use and education of students. Participants were given opportunities to talk about successes as well as difficulties, and were involved in activities that promoted discussion among individuals. Many expressed appreciation for opportunities to become familiar with teachers from other schools.

Two other whole group activities promoted through this PT3 Project included Summer Camp, and Celebration of Successes. During Summer Camp, participants were involved in community building activities alternated with technical skill building and activities to develop skills in technology integration. As often as possible, sharing was expected and encouraged. Summer Camp was held at the beginning of grant activities, and Celebration of Successes was the culminating activity of the PT3 Project for the school year. During the Celebration of Successes, each participant was asked to present the individually chosen project that they completed during the school year. Presentations were to include not only descriptions of the projects and impact of implementation, but also barriers faced and solutions found, and personal successes involved. All participants expressed appreciation for the opportunity to present their own work, and see the work of others. "And the project[s] demonstrated at the Celebration of Successes on the final day of the program [were] fashioned from hard work, cooperation, innovative ideas, comfort with manipulation of the technology, and effective implementation the technology in their classrooms" (Campbell & Özgül, 2001).

Our findings at the end of the first year of the project period showed that teachers and faculty members preferred to plan and work on their projects alone. However, on celebration day when they were presenting, sharing and discussing their projects with the others we have observed that teachers from different schools came up with different ways of using their colleagues' projects in their schools or they came up with combining their experiences together in order to create new, innovative, and collaborative projects to be accomplished in the second year of the project. Because of their improved technology skills level as well as the satisfaction of what they had already accomplished, they were more confident, enthusiastic, and creative and also willing to share and work collaboratively with the other teachers to create better products.

During the planning of the PT3 Project, district level administrators were involved in planning project structure and activities. They were responsible for informing administrators at all school levels, and PT3 Project staff contacted school-level administrators only individually prior to an administrator's meeting arranged several months later. This was a golden opportunity for the PT3 project staff to present and discuss the goals and possibilities of the project with these administrators. Until this meeting, administrators were aware of the PT3 Project and were encouraging their teachers to participate, but this communication between the administrators and project staff as well as among the administrators gave everyone a chance to grasp the scope of the project in detail as well as gain realistic views of seizing the opportunities given by the project.

An administrative meeting was not only beneficial for opening communication with Project Staff as well as among administrators themselves, but also beneficial in resolving several issues which their teachers were encountering in their attempts at effective use of technology. First of all, administrators showed sensitivity to allocate time to project participants to work with their support person on technology training activities, especially weekly meetings at either their school or at the PT3 Project community gatherings. Also, administrators addressed some hardware and software limitations and problems that teachers encountered in their schools. Administrators were also better able to affect teachers' success because reports made available to them by the PT3 Staff provided more information about difficulties teachers had in implementing technology uses. Consequently, having better understanding of teachers' problems with technology, then sharing and discussing these issues with the other schools administrators, inspired them to deal with their teachers' difficulties.

In addition, once the school level administrators were fully aware of the possible impact of the PT3 Project in their schools, they encouraged the teachers in their schools who were not already participating to become active in the project. Participating schools then welcomed PT3 activities in their buildings.

Findings

During the course of the pilot year of the PT3 Project at University of Pittsburgh, several strategies for increasing technology learning and community building were tested, and results were noted. Promising strategies and components identified by teachers as most effective in helping them to reach their technology goals are noted.

Journaling (Learning Log)

Participant teachers were required to keep a reflective journal whenever they used technology applications. The reasons behind the requirement of journaling were two fold. Journaling was beneficial to both the project staff and the participants. Journaling was seen by Project Staff as an opportunity to gain feedback about the provided training as well as track the progress of participants. Feedback gathered from participant journals was used revise the design and implement the training according to entries.

While many of the participants did not enjoy journaling, those who did described it as a reflective tool, providing them an opportunity to reflect on their experiences in using technology. It was also served as a means for participants to document their experiences with technology.

Journaling was also a requirement for the Project Staff. At the end of the first year of the project, Project Staff reported that journaling was a very effective tool for both keeping track of the progress of several teachers that they were assigned to work with, and also preparing for teachers' different training needs. They were also able to use their journals as logs, to identify practices that they use that were particularly effective, and to document their own growth over time.

As a result, journaling was considered as an important tool that contributed to following the progress of the training and adapting it as needed. Because of its benefits to the overall project, it was required of participants in the following years of the PT3 project as well with some modifications. During the pilot year, journaling was done on a notebook and these reflections were copied and given to the their onsite Support Staff. In the following year, journaling was planned to be done on-line.

Note Taking

Note taking plays a very essential role in teachers learning technology skills, especially novice teachers. If these newly learned skills are not practiced frequently, they could easily be forgotten. To prevent that, the teachers and the faculty members were provided with handouts about the instruction. Many times the teachers and faculty personalize the steps by adding notes to the given handouts, and using these notes increased the likelihood that they would be able to practice the same skills successfully on their own. When they had difficulty recalling the skills they had learned, the personalized notes served to refresh their memories. When applications shared similar sets of keystrokes or menu options, creation of handouts that repeated the same formatting for such items served to jog the memory and helped to make connections that transferred application of the skills.

Concept Mapping

Sometimes it is very difficult for teachers and faculty who were novice computer users to understand how the skills they have been learning are related to their final projects. Using concept mapping as a cognitive strategy gave them a visual tool for conceptualizing the relationship between the each group of skills needed to be learned and the relationship of those skills to the main goal. Therefore, the opportunity of seeing visually which skills are required to reach the goal, what they have already learned, and what still needs to be learned helped both the Support Staff as well as the teachers to plan the best sequence of learning activities.

Comfort and Confidence

Teachers were supported in many ways to reach their goals for the end of the first year of the PT3 project. For example, flexible technical support, opportunities to gather the projects participants in workshops as well as monthly meetings, and having the flexibility to alter the final projects were important key elements in increasing the teachers' comfort level with working for their goals and with project staff. Additionally, seeing the final projects of the previous years' participants, as well as listening to their experiences, increased the confidence level of the teachers participating in the project in the second year. Therefore, it was assumed that the anxiety and the disappointment that the first year participants encountered would be somewhat reduced for participants entering in the second year.

Technology Learning Support

Much of the success of the first year of implementation of the PT3 project was attributed to the availability, flexibility, technical skills, and knowledge of good tutoring practices of the technical Support Staff. A number of teachers had difficulty scheduling meeting times during their busy daily work routine. The flexibility of the technology Support Staff made it possible to schedule time slots that meet the schedules of the teachers. As state earlier, it was very important to maintain contact with participants between meetings, by email or phone.

Participating teachers mentioned in their evaluation forms that one of the greatest assets of the project was the On-Site Support Staff members' enormous patience. They were willing to repeat the same instruction many times when teachers needed them to do so. As mentioned earlier, the On-Site Support Staff were very creative in finding ways to present the same information in multiple ways.

Individual Classroom Projects

Participating teachers and faculty members were required to choose an individual project at the beginning of PT3 Project participation. They were expected plan it, including modifications, then present it at the end of the year. These chosen projects could reflect any subject area(s). Projects required that participants learn new skills as they created the projects, but the only software and hardware restrictions were those imposed at their schools sites, usually based on availability. Their anxiety and disappointment were resolved by comforting them that the final project requirement was meant to have them to experience from the beginning of the project how to plan, develop and design, evaluate and redesign their final projects and support them along the way. Also, their technical support person would be helping them to achieve their goals and would be providing them with support to learn the necessary technical skills to complete their projects.

Summary

From the implementation of the PT3 Project, many lessons were learned that can be used to increase the technology learning of teachers and faculty. The following list summarizes the discoveries described here. In this section, the term learners refers to the educator who is attempting to learn new technology skills and increase technology integration.

- On-going training should be provided, both technical and technology learning support, and should be flexible and individualized.
- Support provided for long term learning should include regular follow up and contact with learners - via email or phone when not in person.
- Manuals and reference documents should be provided when learners are working independently
- Note taking done while learning to use hardware and software is often useful for learners when working independently.
- Learners should be provided concept mapping tools, and taught to use concept maps and other visual tools for project planning, time management and for setting and achieving goals.
- Learners should be provided opportunities and encouragement to work in groups right from the start, and be discouraged from remaining separate, even during informal training.
- Maintain contact with building and district level administrators to get them involved and excited, and keep them informed.
- Experienced participants should be encouraged to share their successes with new group members.
- All projects that learners are expected to undertake should be relevant to them.
- If taught to write reflectively, learning logs can be very useful.

Any professional development project should look closely at the needs of its community members, and consider which items can be applied most successfully. In the creation and implementation of University of Pittsburgh's PT3 Project professional development program for teachers, discoveries were made that could be useful in helping to avoid difficulties and identify areas of potential weaknesses. They can also be used to identify strengths that can increase probability of success.

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